

O I P E  
JUL 02 2002  
PATENT & TRADEMARK OFFICE

Figure 1

Verfi: 1 to 3640

CCGGGGGAGTGGGGAGGAGGGGGGTCGGCCGCCGAGCCATGGAGGCCAAGTGGACCGGTTCTGTTCCAGGCCACGAAGCATCCCAT  
M E A N W T A F L F Q A H E A S H 17 90  
 CACCAACAGCAGGCAGCGAGAACAGCTTGCTGCCCTCTGAGTCTCTGCTGTTGGAGCCCTGATCAGAAACCGTTGCTCCAACTACCA  
H Q Q Q A A Q N S L L P L L S S A V E P P D Q K P L L P I P 47 180  
 ATTACTCAGAACCTCAGGTGACCCAGAACATTAAAGGATGCCATTGGGATTTAAAGAAAACCCAAAACCTCGTTGTGCTGCACT  
I T Q K P Q A A P E T L K D A I G I K K E K P K T S F V C T 77 270  
 TACTGCAGTAAAGCATTCAGGGACAGCTATCACCTGAGGCCCATCAGTCTGCCACACAGGGATCAAGTGGTGTCTGGCAAAGAAA  
Y C S K A F R D S X H L R R H O S C H T G I K L V S R A K K 107 360  
 ACCCCCACCRACGGTGGTCCCTTATCTCCACCATGCTGGGACAGCAGGCCAAGTGGTGTGCCAGTCTGCAAGAAACCCAGT  
T P T T V V P L I S T I A G D S S R T S L V S T I A G I L S 137 450  
 ACAGCTCACTACATCTCCCGGGACCAACCCAGCAGCAGGCCAGTACAGCAATGCCATGGCTGTGCCAGTCTGCAAGAAACCCAGT  
T V T T S S S G T N P S S A S T T A M P V P Q S V K K P S 167 540  
 AAGCTGTCAAGAAGAACCCAGCCTGTGAGATGTGGAAAGGCCCTCCGGGATGTGACCACTCAATCCGACAAGCTCTCCATTG  
K P V K K N H A C E M C G K A F R D V X H L N R H K L S H 197 630  
 GACGAAAAGCCCTTGTAGTGCTTATGTAACTAGCGCTTCAGAGGAAGGACCGATGACTTACCATGTGAGGTCTCATGAAGGAGGC  
D E K P F E C P I C N O R E K R K D R M T X H V R S H E G G 227 720  
 ATCACAAACCCATACTGCACTGTTGTGGAAAGGCTCTCAAGGCCATGGCTGTGCAAGACTACGGACACACATGGTGCACAGGAG  
I T K P Y T C S V C G K G F S R P D H L S C H V K H V H S T 257 810  
 GAAAGACCCCTCAATGCCAACCTGCACTGCTGCCCTTGGCCACCAAAGACAGACTACGGACACACATGGTGCACAGGAG  
E R P F K C O T C T A A F A T K D R L R T H M V R H E G K V 287 900  
 TCATGTAACATCTGTGGGAAGCTCTGAGTCAGCATATACCAAGCCACTAAAGACACATGGCAGAGGCCAAAGTATCAACTGTAAC  
S C N I C G K L L S A A Y I T S H L K T H G Q S Q S I N C N 317 990  
 ACGTGCAAACAAGGCATCAGCAAACAGTCAGTGAAGTGAGGAGACCGACAATCAGAAGCAGCAGCAGCAGCAGCAGCAGCAG  
T C K Q G I S K T C M S E E T S N Q K Q Q Q Q Q Q Q Q Q Q Q Q 347 1080  
 CAACAACAACAATGTGACAAGCTGGCAGGGAAAGCAGGTAGAGACACTGAGACTGTGGAAAGAGCTGTGCAAGCAAGAAGAG  
Q Q Q Q Q H V T S W P G K Q V E T L R L W E E R V K A R K K E 377 1170  
 GCTGCCAACCTGTGCCAACCTCACGGCTGCTACGACACCAGTGAECTCTCACTACTCCATTCAATATAACGTCTCTGTGCTGG  
A A N L C Q T S T A A T T P V T L T T P F N I T S S V S S G 407 1260  
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T M S N P V T V A A A M S M R S P V N V S S A V N I T S P L 437 1350  
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T S P M N L P T P M T L A A P L N I A M R P V E S M P F L P 497 1530  
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Q A L P T S P P W 506 1620  
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ACAACAGAAATCATTATTGTTAAACACTGAGCAGAGTCTCTCTGCTACAGAGGTTTACCTGAGCTGAGCTGAGCTGAGCT  
GAGAGCTAGTGTAGCATGCTGTGGTTGCTGCTGATGAGCTGAAACAGGCCATTGCTATAAAATGCTTACAGAGAAATATGCA  
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AGTCCCACAAGACACCCTCCACCCAGAGAGCCATGGGGACCCATGGGGTGGACACCAGGGCTGGGTGGAGTGAACCTCTC  
GGGCAAGGCTGGCTTACAGGAGCTGGCTGGCTGGAGAACATCTGGGTCTGTGAGTGAACCTCTCACCACAGGCTGG  
TAGAGCAAGTACAGATGCCCTGTAGCCAGATTGGAGGCTGTCTGGTGTGCTAGGAGAAGGCCCTGCCCATTTG  
TCTTAGGAGGTCTAGGACTGGGTATGGGAGTGGGGTCTGTGACTCTCAGTGGGCTCCCTGTCTAAGTGGTAAGGTGGGAT  
TGTCTCATCTTGTCTAATAAAGCTGAGACTTGAAAAA

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**Figure 2**

## Human DB1 DNA and Protein Sequences:

10 20 30 40 50 60  
 AGCGGGGGAGTGGGAGGAGGGGGTCGGCCGCAGCCATGGAGGCCAACTGGACCG  
 M E A N W T>  
 70 80 90 100 110 120  
 CGTTCCCTGTTCCAGGCCATGAAGCTTCCCACCAACAGCAGGCAGCACAGAACAGCT  
 A F L F Q A H E A S H H Q Q Q A A Q N S>  
 130 140 150 160 170 180  
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 L L P L L S S A V E P P D Q K P L L P I>  
 190 200 210 220 230 240  
 CAATAACTCAGAAACCTCAGGGTGCACCAGAAACATTAAAGGATGCCATTGGGATTAAAA  
 P I T Q K P Q G A P E T L K D A I G I K>  
 250 260 270 280 290 300  
 AAGAAAAACCCAAAACCTCATTGTGTGCACCTACTGCAGTAAAGCTTCAGGGACAGCT  
 K E K P K T S F V C T Y C S K A F R D S>  
 310 320 330 340 350 360  
 ATCACCTGAGGCGCCACGAATCCTGCCACACAGGGATCAAGTTGGTGTCCCGGCCAAAGA  
 Y H L R R H E S C H T G I K L V S R P K>  
 370 380 390 400 410 420  
 AAACCCCCACCACGGTGGTCCCTTATCTTACCATCGCTGGGACAGCAGCCGAACATT  
 K T P T T V V P L I S T I A G D S S S R T>  
 430 440 450 460 470 480  
 CGTTGGTCTCGACCATTGCAGGCATCTTGTCAACAGTCAGTCACTACATCTCCTCGGGCACCA  
 S L V S T I A G I L S T V T T S S S S G T>  
 490 500 510 520 530 540  
 ACCCCAGTAGCAGTGCCAGCACACAGCTATGCCAGTGAACCCAGTCTGTCAAGAAACCCA  
 N P S S S A S T T A M P V T Q S V K K P>  
 550 560 570 580 590 600  
 GTAAGCCTGTCAAGAAGAACCATGCTTGTGAGATGTGTGGAAAGGCCTTCCGAGATGTGT  
 S K P V K K N H A C E M C G K A F R D V>  
 610 620 630 640 650 660  
 ACCATCTCAATCGACACAAGCTCTCCATTCAAGATGAGAAACCCTTGAGTGTCCATT  
 Y H L N R H K L S H S D E K P F E C P I>  
 670 680 690 700 710 720  
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 C N Q R F K R K D R M T Y H V R S H E G>  
 730 740 750 760 770 780  
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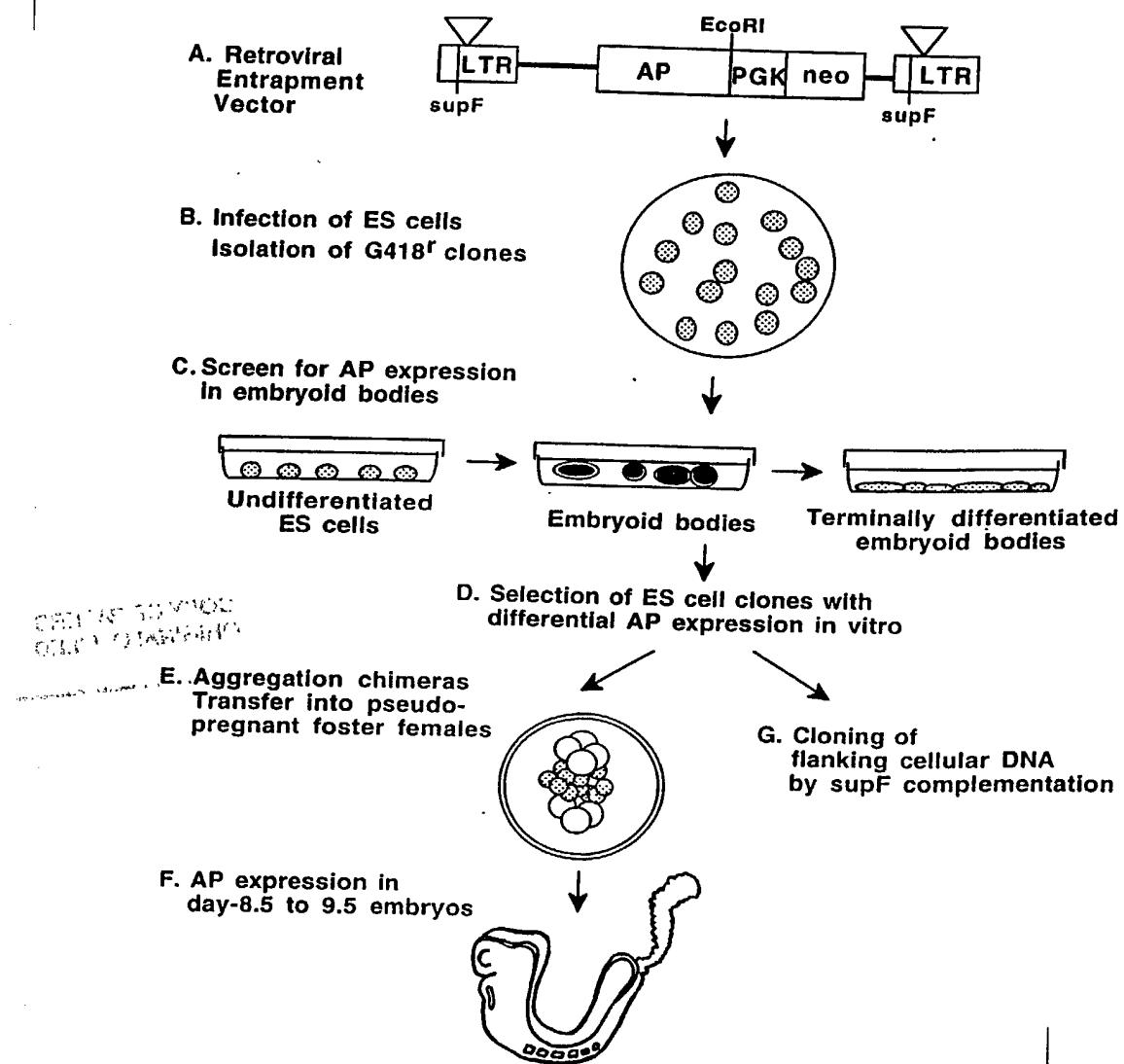
Figure 2 (con't)

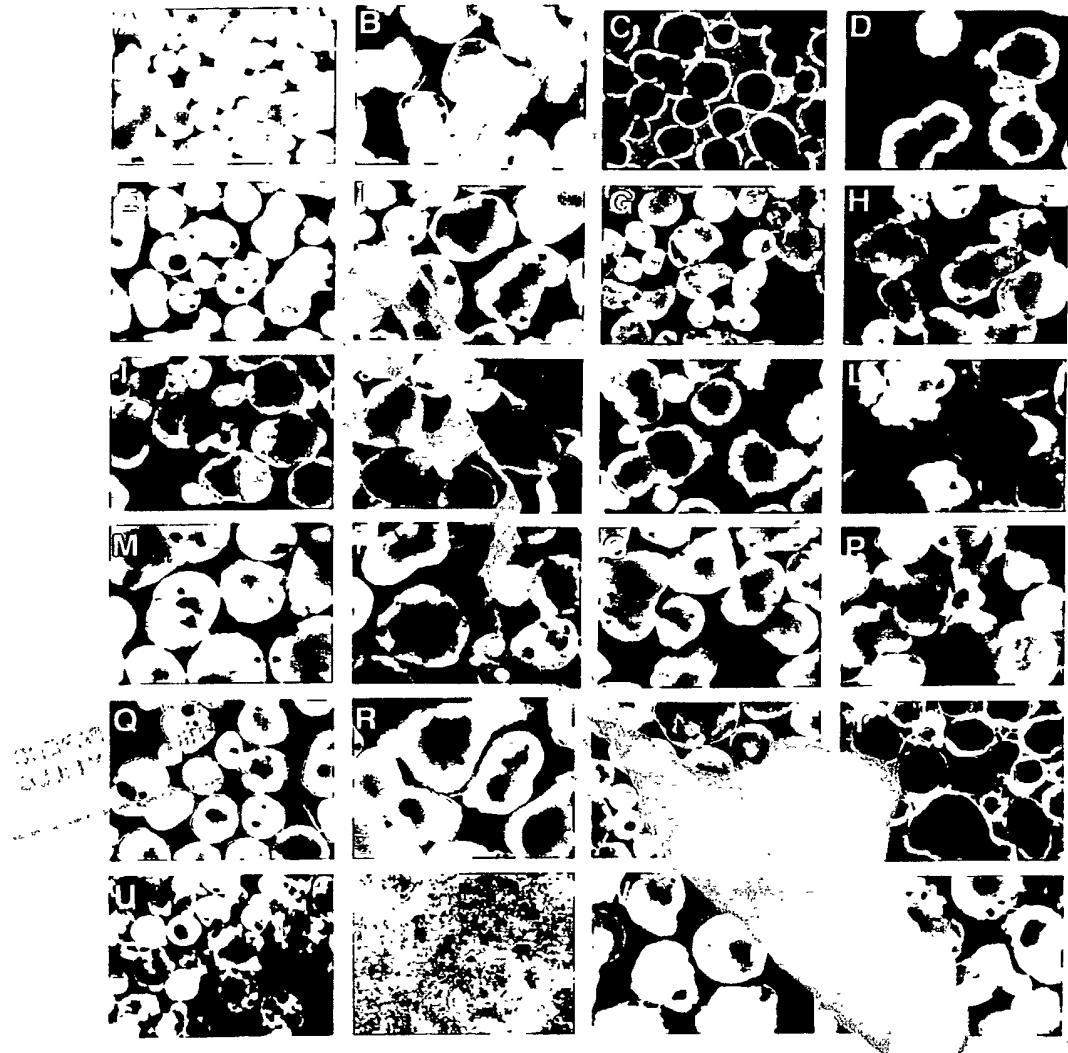
790            800            810            820            830            840  
 TAAGCTGTATGTAAAACATGTCCATTCAACAGAAAGACCCTCAAATGCCAAACGTGCA  
 L S C H V K H V H S T E R P F K C Q T C>  
  
 850            860            870            880            890            900  
 CTGCTGCCCTTGCACCAAAGACAGACTGCGGACACACATGGTGCGCCATGAAGGCAAGG  
 T A A F A T K D R L R T H M V R H E G K>  
  
 910            920            930            940            950            960  
 TATCATGTAACATCTGTGGGAAGCTCCTGAGTGCAGCATACTACACCAGCCACTTAAAGA  
 V S C N I C G K L L S A A Y I T S H L K>  
  
 970            980            990            1000          1010          1020  
 CTCATGGGCAGAGCCAAAGTATCAACTGTAATACATGTAAACAAGGCATCAGTAAACAT  
 T H G Q S Q S I N C N T C K Q G I S K T>  
  
 1030          1040          1050          1060          1070          1080  
 GCATGAGTGAAGAGAGCAGTAACCAAAAGCAGCAGCAGCAGCAGCAGCAACAACAC  
 C M S E E T S N Q K Q Q Q Q Q Q Q Q Q Q>  
  
 1090          1100          1110          1120          1130          1140  
 AACAAACAACATGTGACAAGCTGCCAGGGAAAGCAAGTAGAAACACTCAGACTGTGGAAAG  
 Q Q Q H V T S W P G K Q V E T L R L W E>  
  
 1150          1160          1170          1180          1190          1200  
 AAGCTGTTAAAGCAAGGAAGAAAGAAGCTGCTAACCTGTGCCAACCTCCACGGCTGCTA  
 E A V K A R K K E A A N L C Q T S T A A>  
  
 1210          1220          1230          1240          1250          1260  
 CGACACCTGTGACTCTCACTACTCCATTCACTATAACATCCTCTGTGTCGTCTGAGACTA  
 T T P V T L T T P F S I T S S V S S E T>  
  
 1270          1280          1290          1300          1310          1320  
 TGTCAAACCCAGTCACAGTGGCAGCTGCAATGAGCATGAGAAGTCCAGTAAATGTTCAA  
 M S N P V T V A A A M S M R S P V N V S>  
  
 1330          1340          1350          1360          1370          1380  
 GTGCAGTTAACATAACCAGCCCAATGAACATAGGGCATCCTGTAACTATAACCAGTCCAT  
 S A V N I T S P M N I G H P V T I T S P>  
  
 1390          1400          1410          1420          1430          1440  
 TATCCATGACCTCTCCTTAAACACTCACTACCCAGTCACACTCCCCACCCCCGTCACTG  
 L S M T S P L T L T T P V N L P T P V T>  
  
 1450          1460          1470          1480          1490          1500  
 CCCCCAGTGAATATAGCACACCCCTGTCAACCACATCTCCAAATGAATCTACCCACACCTA  
 A P V N I A H P V T I T S P M N L P T P>  
  
 1510          1520          1530          1540          1550          1560  
 TGACATTAGCCGCCCTCTCAATATAGCAATGAGACCTGTAGAGAGCATGCCCTTCTTGC  
 M T L A A P L N I A M R P V E S M P F L>

Figure 2 (con't)

1570	1580	1590	1600	1610	1620
CCCAAGCTTGCCTACATCACCGCCTGGTAAACAGTATTATAAAATCAAAATATGGGTA					
P	Q	A	L	P	T
S	P	P	P	W	*
1630	1640	1650	1660	1670	1680
AAAGTAAATATTACCGCAACTAACCTTAACTTTAGTTGATTAAAGCAAAAGTAAACCATGA					
1690	1700	1710	1720	1730	1740
AATTGGGAGATTTATTACATTAGTTAATAAGAGTGTGGTAGCATTCTCCAATTGG					
1750	1760	1770	1780	1790	1800
CTGGGATTATTCAAAGTAGGGTGTGTATGTAACCTTATCACTGGACCACTTAGTTAAC					
1810	1820	1830	1840	1850	1860
AGAAATTCCCTTTAGCTGACAACATTGCTAACAGGATAGTAGTTGGCAAGATGAAATG					
1870	1880	1890	1900	1910	1920
CCAGAATTAAAACCAATCATAAGTAGAACCACACTCAAAATAAAAAACAGCATTACTAT					
1930	1940	1950	1960	1970	1980
TTCTAATCCCAAGGAATCACTTTATTGAAACACTAGCAGAACTCTTCTCCCTATACAAG					
1990	2000	2010	2020	2030	2040
GTGGATGGCTGATTTAACCTGAAATTAAATCCACAGATTGAGAGCTAGTGTAGAATT					
2050	2060	2070	2080	2090	2100
GTCTGTGTTATTGTTTATGAGTAAATACATGCATGTCATAATAAAATGCATTTCAG					
2110	2120	2130	2140	2150	2160
AGAATATGCATTTACCTTGGGAATATGTTAATTTCAGGCAGCATTCCCTATGGGAAAG					
2170	2180	2190	2200	2210	2220
GTGATACCAGCTCTGATATGCAAAGCATATGATAATTATCATTCTAACCTAACGTATA					
2230	2240	2250	2260	2270	2280
ATAGGGATTGTGACCTGATATTGGAGATGTAATATTGCTCAGCATATTAATCCCGATG					
2290	2300				
GAATATAGCATTGTAGTTGACTTTT					

Figure 3



**Figure 4**

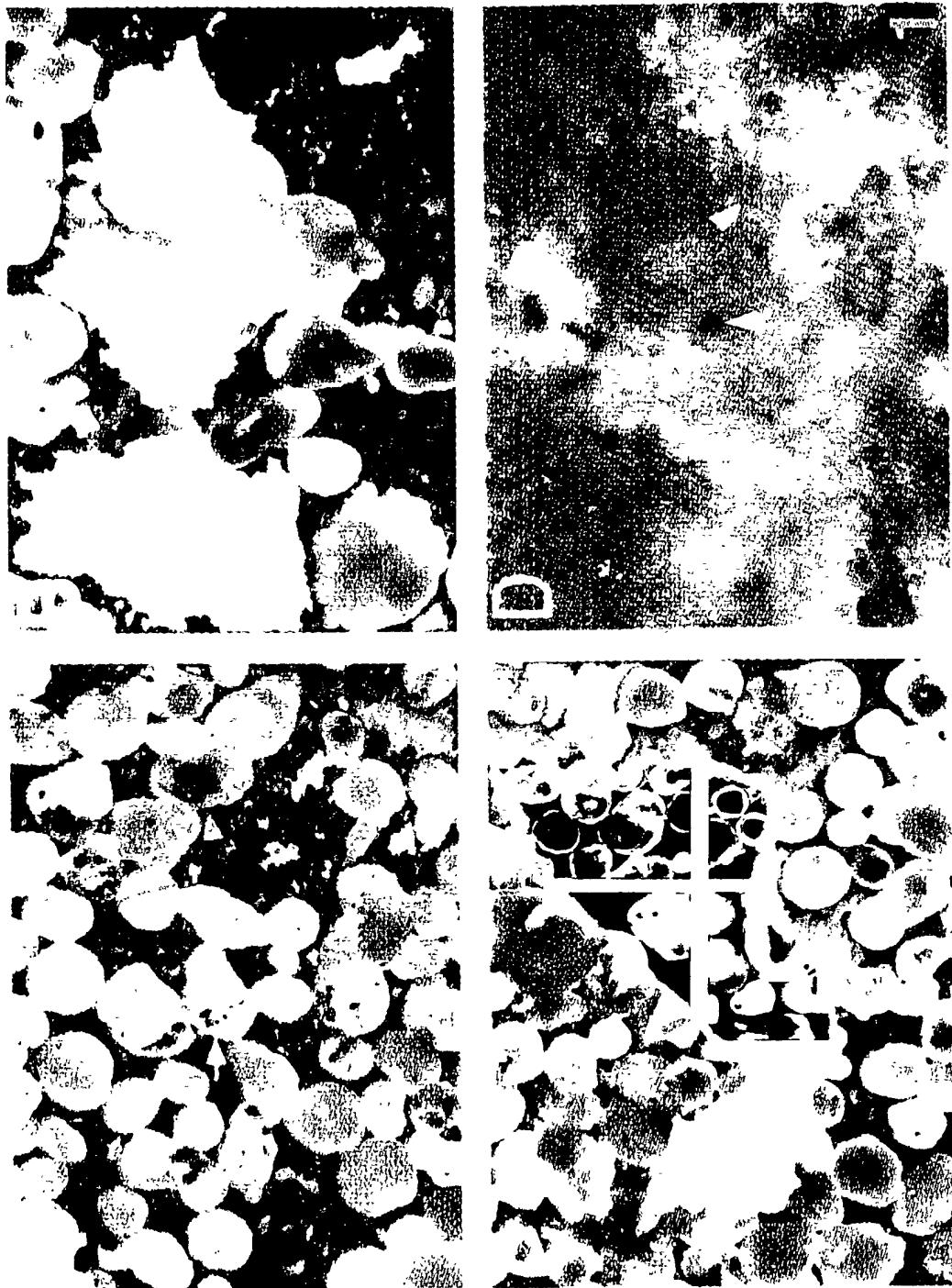
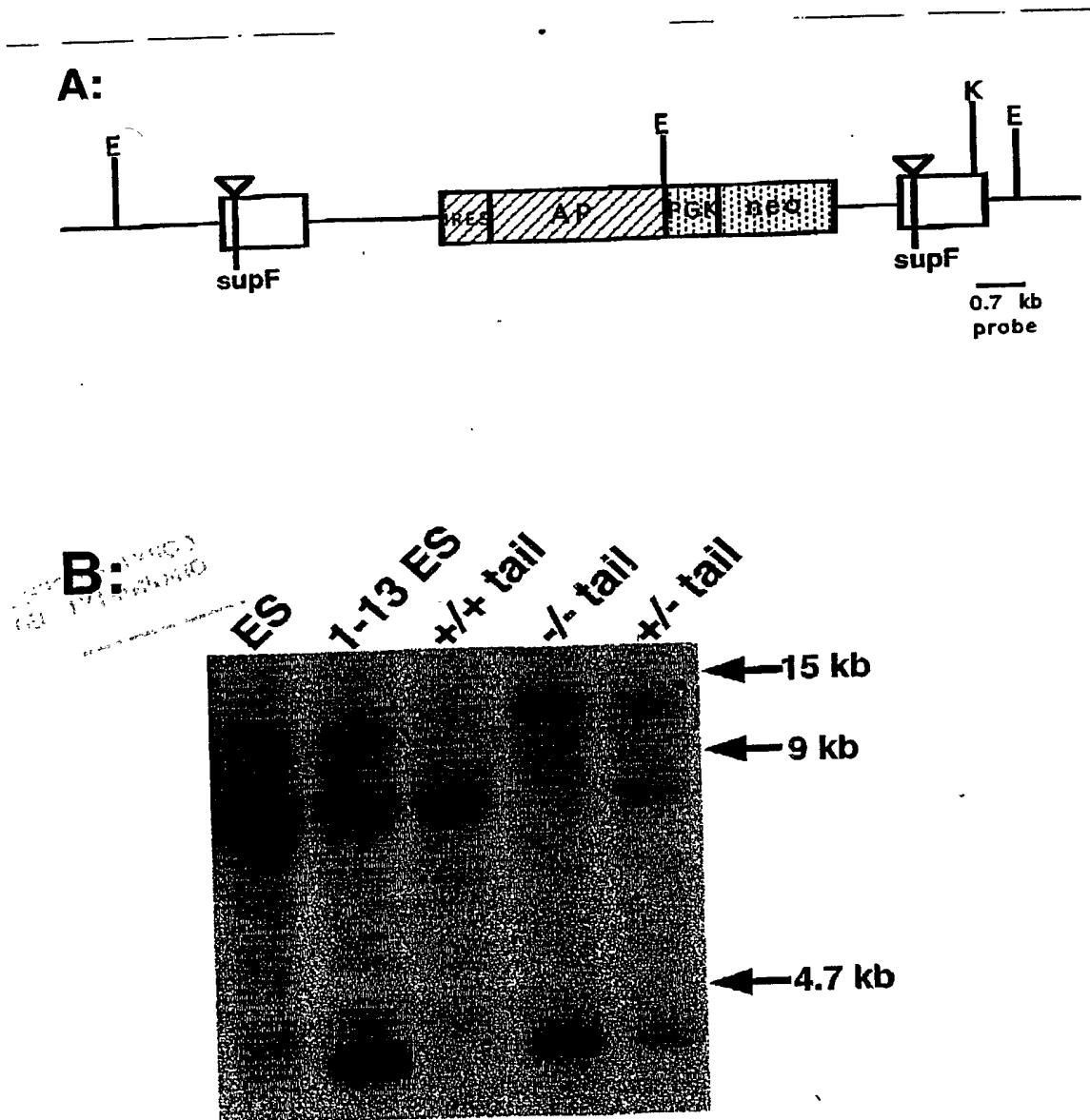


Figure 5

Figure 6



22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Assignment of Vef1/mpuri:

Vef1	168	KPKKNAACMGKAFRUVHHLKLSNSDKPTECICHQPRKRDRTTHVPSHGGITKTYTCSVOKFSPDPLSCKVAVMASTERDFKQ	264
mpuri	275	KRURKHACMGKAFRUVHHLKLSNSDKPTECICHQPRKRDRTTHVPSHGGITKTYTCSVOKFSPDPLSCKVAVMASTERDFKQ	372
Vef1	265	TCTTAAPATHDRUHTMVHESKVSCHICLTLASAVTSHLHKTGQSINCNTCKGQISKTCSSETSTSKQOOOOOOOOOOOOOOOOQVTSWPKQ	360
mpuri	373	KCEAFAPATDRUHTMVHESKVSCHICLTLASAVTSHLHKTGQSINCNTCKGQISKTCSSETSTSKQOOOOOOOOOOOOOOQVTSWPKQ	469

Figure 7

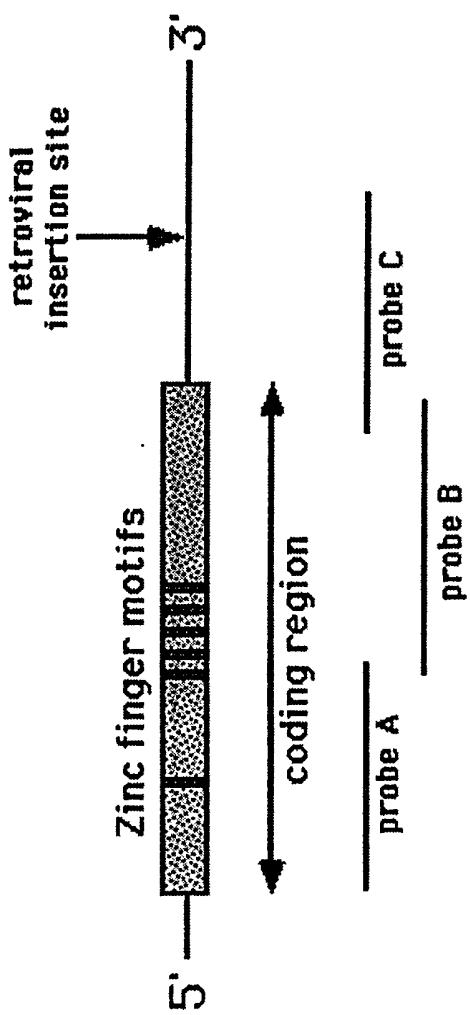


Figure 8

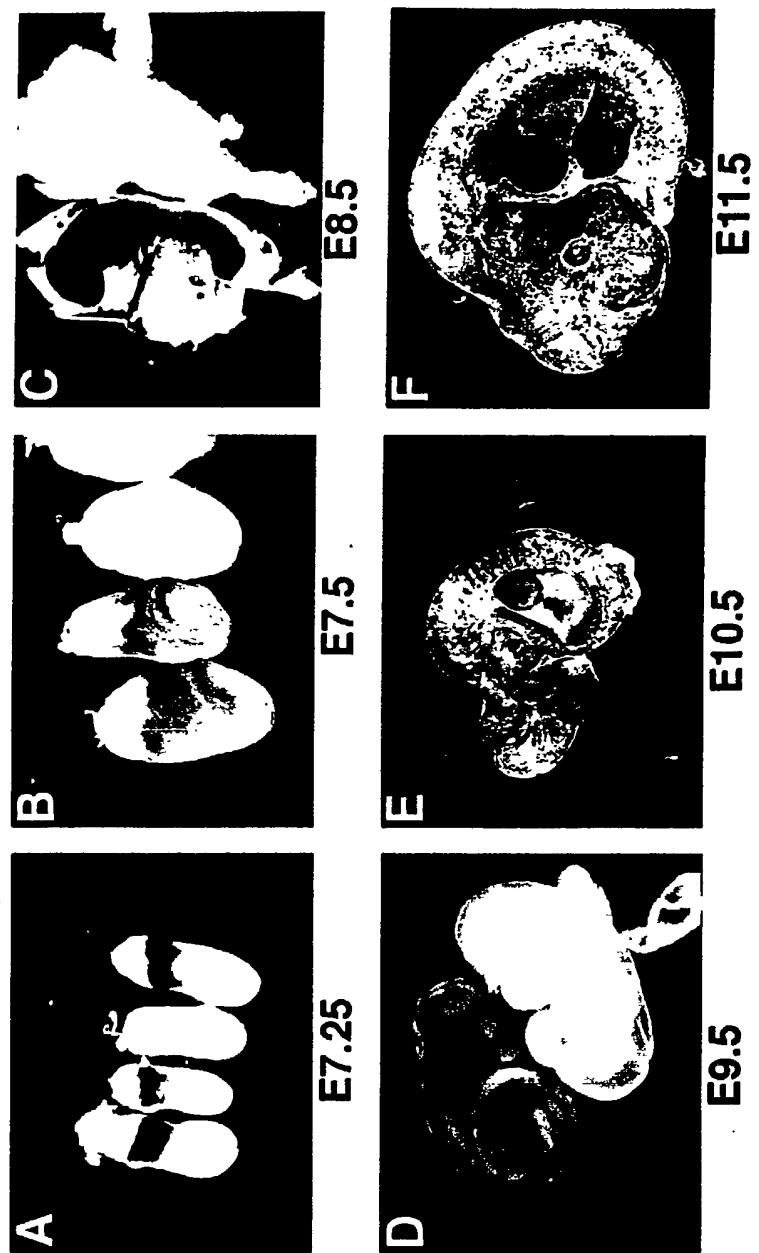


Figure 9

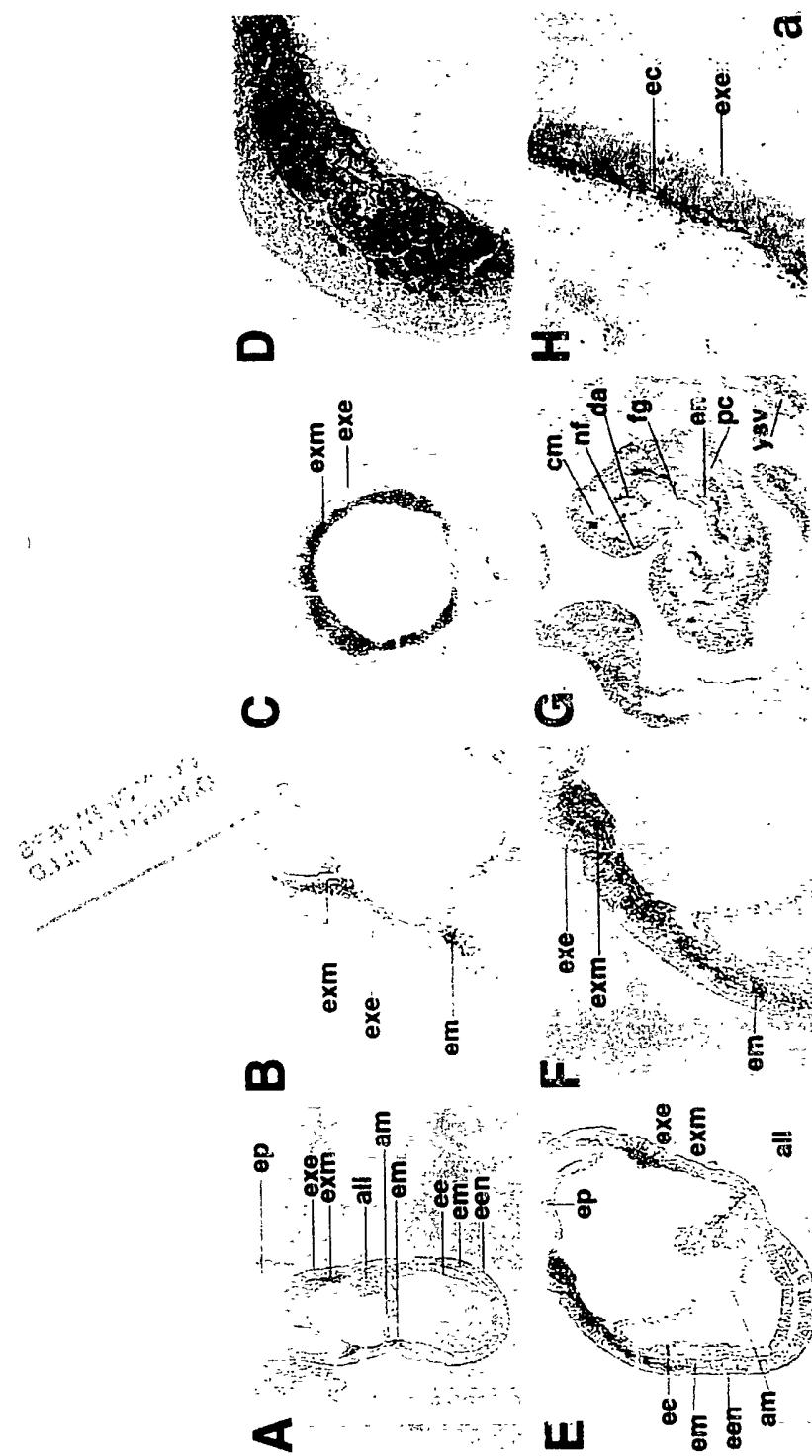
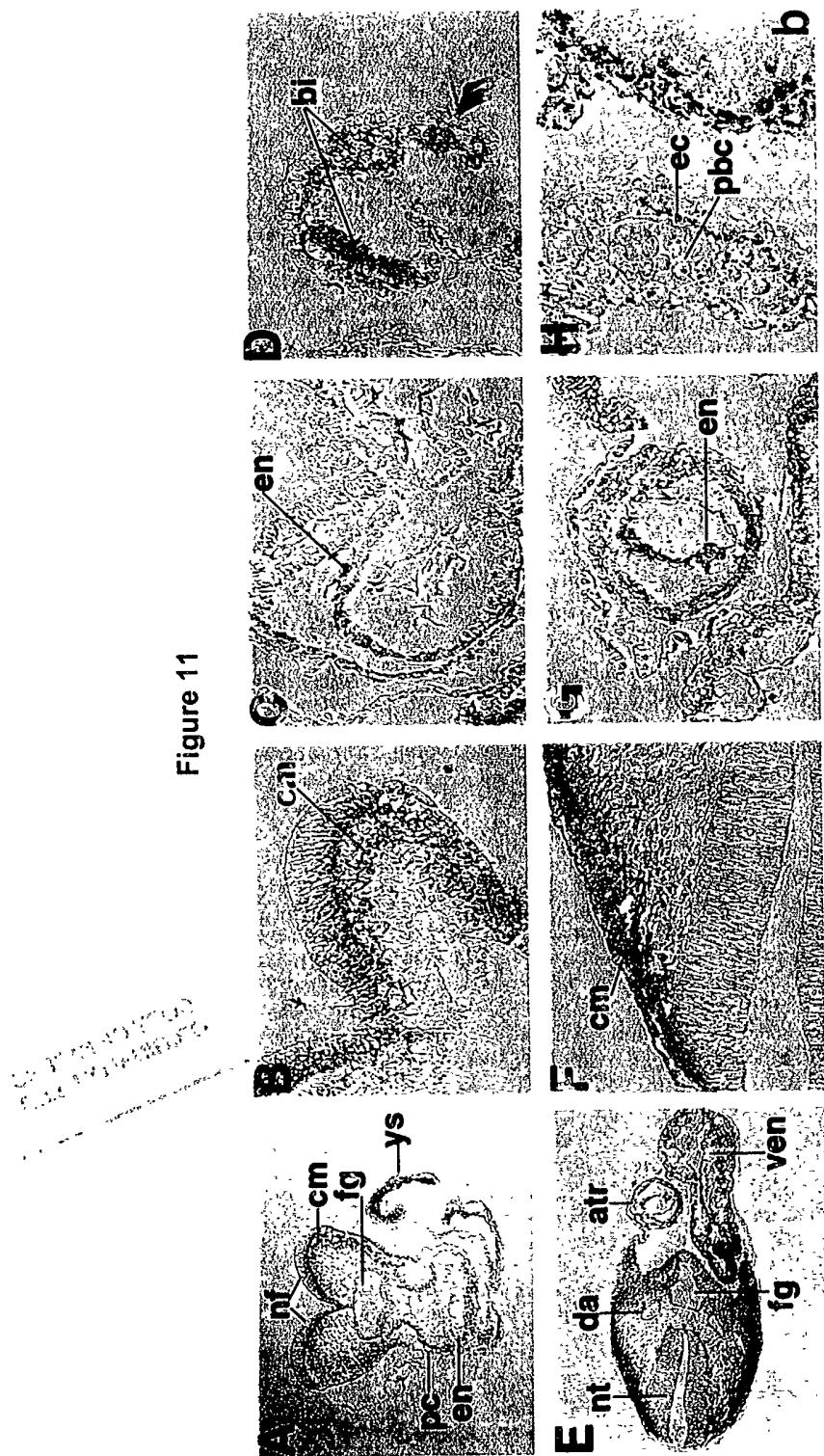


Figure 10

Figure 11



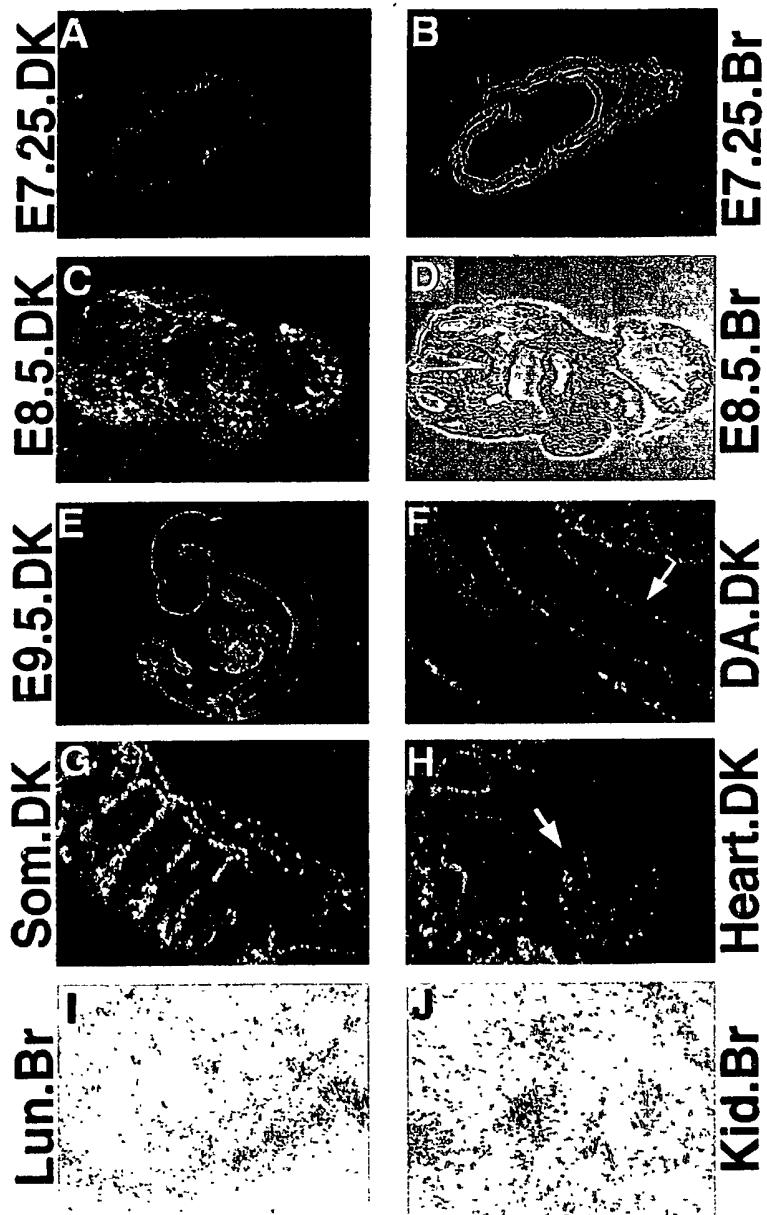
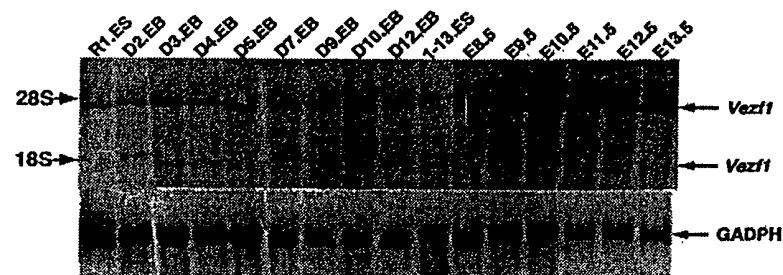


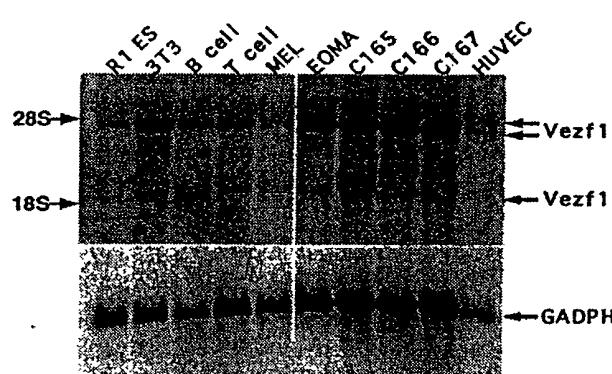
Figure 12

Figure 13

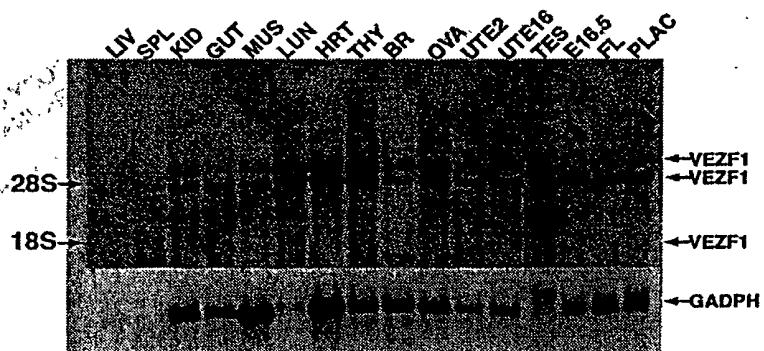
A.



B.



C.



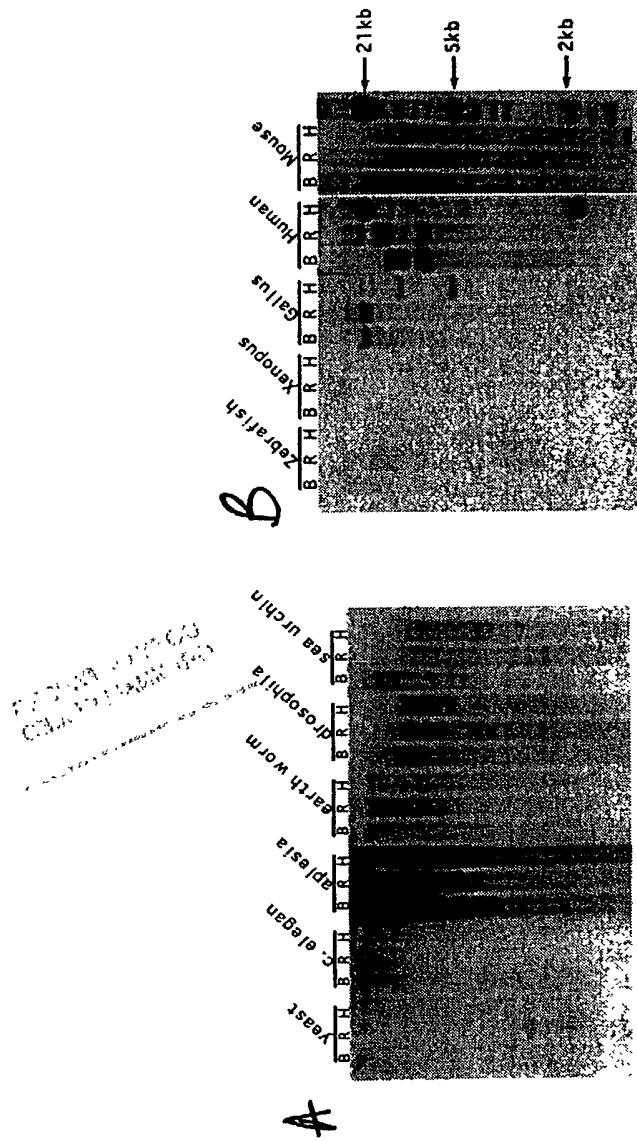
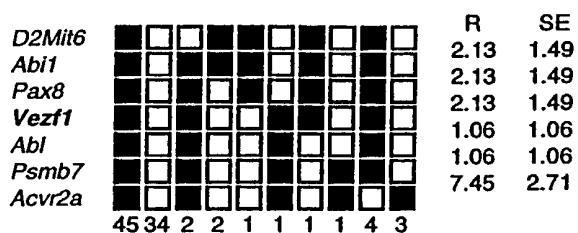
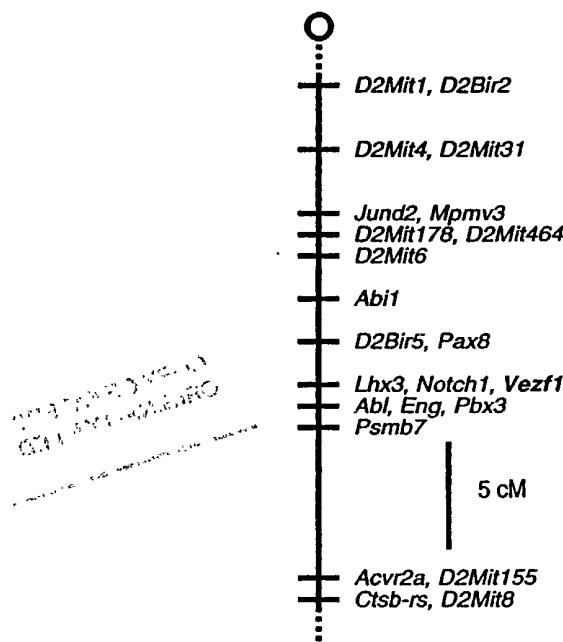


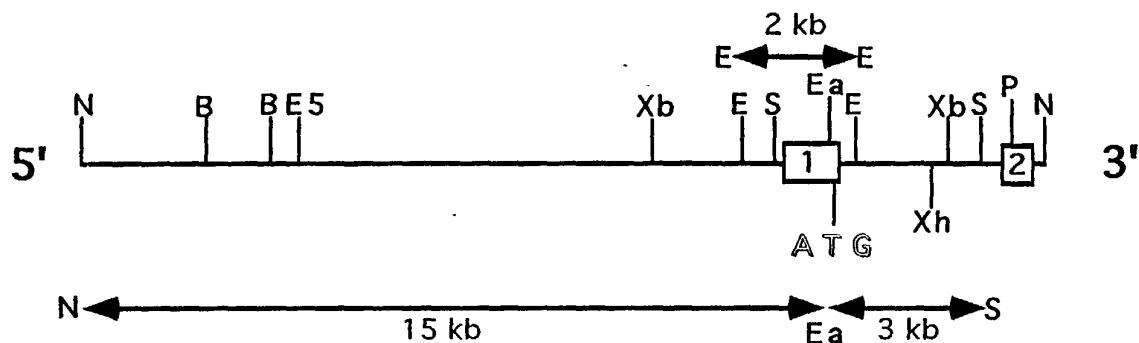
Figure 14

**Figure 15****A: Jackson BSS Chromosome 2****B: Jackson BSS Chromosome 2**

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Figure 16

## Restriction Enzyme Map of a 20 kb Genomic DNA of the Vezf1 Gene



BamHI (B), EcoRI (E), EcoRV (E5), Eagl (Ea), NotI (N), PstI (P), SacI (S), XbaI (Xb), and Xhol (Xh).

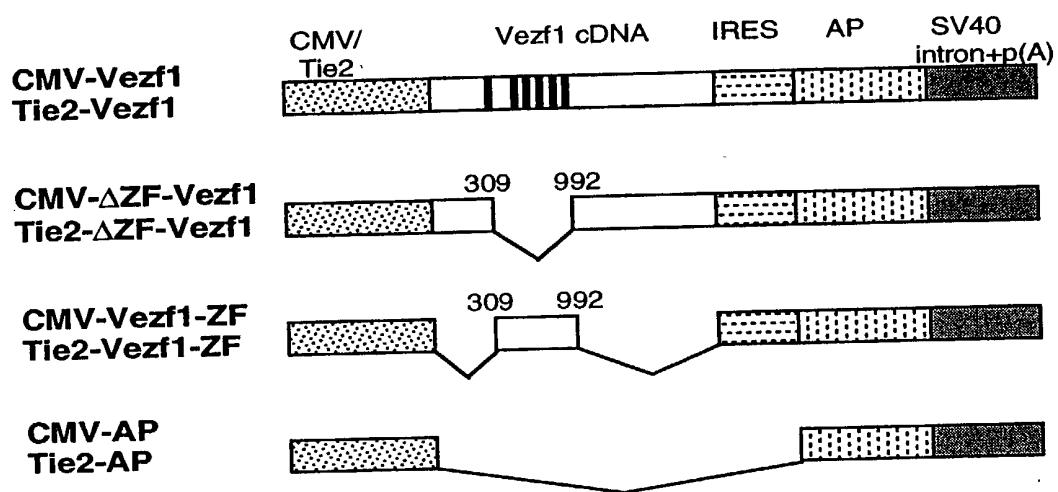
— Intronic sequence;

**1** Exon 1

**2** Exon 2

Figure 17

### Vezf1 EXPRESSION VECTORS



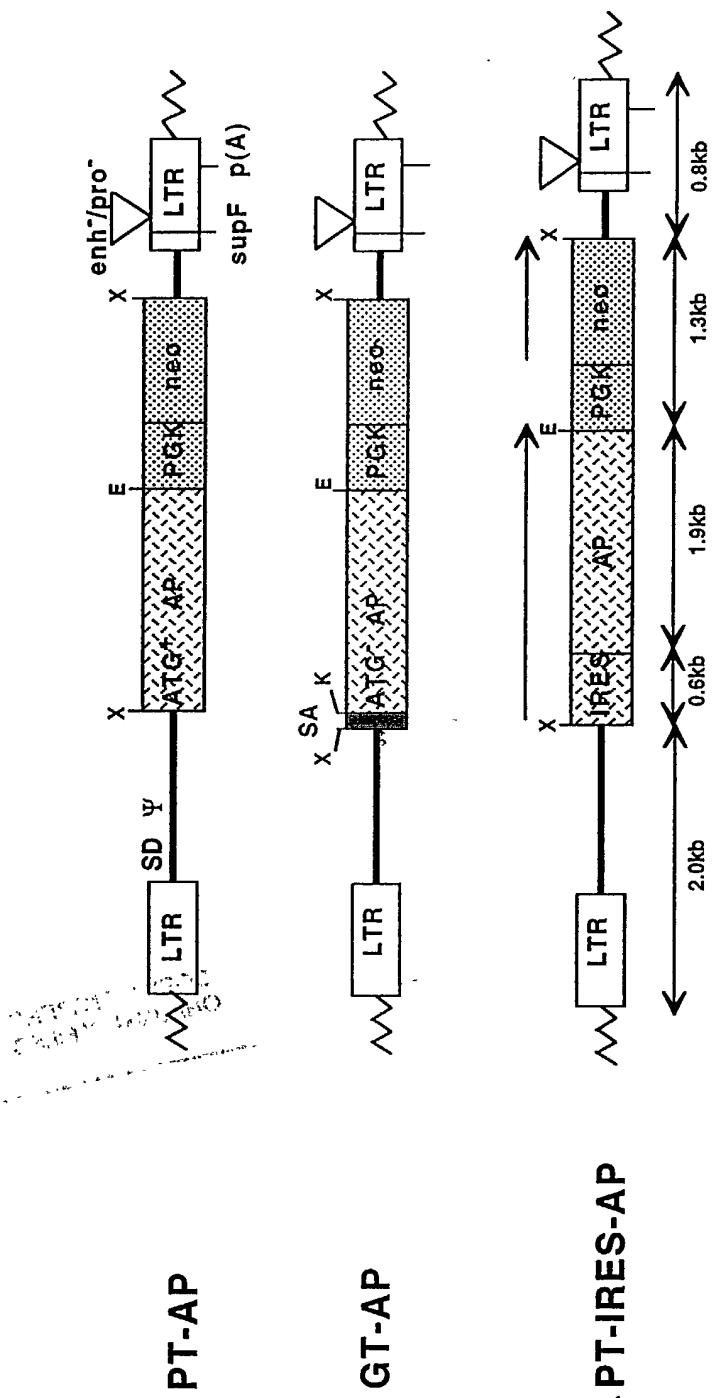


Figure 18